VES No. 2060

United States Senate

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ROOM 5202, DIRKSEN OFFICE BUILDING

MAR 17 Washington, D.C., 3/15, 1983

Referred to Werner Swann

Testimony on NOAA Audit

3/14

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STATEMENT OF DAVID JOHNSON, UNIVERSITY CORPORATION FOR ATMOSHPERIC RESEARCH AND VERNER SUOMI, PROFESSOR OF METEOROLOGY, UNIVERSITY OF WISCONSIN

Mr. Johnson: Thank you, Mr. Chairman. I am certainly pleased to be asked to comment on the proposed NOAA budget for 1984 as it relates to the nation's weather satellite program. As the former assistant administrator of NOAA for satellites, I have more than a passing interest in the subject.

Since retiring from NOAA over a year ago, I have been working as a consultant to the Secretary General of the World Meteorological Organization, which has been mentioned by one of the previous witnesses. This is a specialized agency of the United Nations on maintaining -- consulting on maintaining and improving the World Weather Watch. This is a cooperative network that Peter Leavitt mentioned for the exchange of weather data among all the nations of the world.

I am also serving as a special assistant to the President of the University Corporation for Atmospheric Research, UCAR, which is a consortium of 50 universities that have graduate programs in atmospheric and related sciencies. I want to emphasize that I am appearing here in my personal capacity. However, this recent experience has broadened view of the importance of the satellite system beyond the needs of the U.S. government.

not be considered as a domestic issue only. This nation should and does have a responsibility in the larger community of nations. This community should be involved in finding responsible alternatives if, indeed, the United States no longer is in an economic position to continue financing the present system upon which the world has become so dependent.

Thank you, Mr. Chairman.

Senator Trible: Thank you, Dr. Johnson. Dr. Suomi?

Mr. Suomi: Thank you, Mr. Chairman, for this opportunity to say a few words on the NOAA budget, and again, especially on the impact of the nation's weather satellite program.

As I say in my testimony, these words are my own, but the general thrust of my testimony reflects the views of the National Academy of Sciences Board on Atmospheric Sciences and Climate. The Board has expressed a willingness to look into the impact of commercialization of the nation's weather satellite program; however, they have had no information on this presented to them so far, so ~~as regards to that topic, these words~~ will be my own.

Some of this is a little repititious with Dave Johnson, ~~since he is~~ my dear friend ~~and he read~~ my testimony first.

Well, Mr. Chairman, we find -- and now I am speaking for the Academy's views -- that the budget is neither realistic nor responsive to the scientific opportunities and the national needs. I will elaborate on this by briefly

discussing the program's health, its uniqueness and where the problems are and what might be done about them.

We must first say, as the others who have appeared before us, that there is a very positive side and much of it has come thanks to the success of the global weather experiment which the Congress endorsed some years ago. We can say that both the polar and geostationary weather satellites have made it possible to improve the accuracy and extend the range of weather forecasts of large storms. These results -- and they are very impressive -- have been obtained thus far in the research mode.

Some of these improvements have already been made in our operational forecasts, but we can expect even greater improvements in the future as these new findings are made operational. However, this is not the time to go into details because in my view, these advances will never be realized if the present budget is put in place.

I could easily talk about this for a long time and describe the contributions both the geostationary and the polar orbiters have made, but Mr. Johnson has already talked about this. I really want to re-emphasize the impact of a policy to provide only one polar orbiter instead of the two-satellite system we have employed so successfully. The key issue is that failure of this single polar orbiter would leave us without observations. You have to appreciate that our geostationary

satellites cover the United States and a little of the Pacific, some of the Atlantic, but it is the polar orbiter which covers the globe and where we get our data from to make longer-range predictions.

We are learning that the weather over Indian ultimately affects us in the United States. You have heard others before me say that things going on in the western Pacific affect the climate and the weather over the United States. So to give up the polar orbiter for a long time would be tragic.

This key element of the global weather system would collapse with catastrophic results. We would have zero soundings coverage over the ocean. The ocean is where we have a great deficiency of data. Over the populated countries particularly of the Northern Hemisphere there is pretty good data from balloon soundings and so on. But over the large reaches of the ocean -- and three-quarters of the earth is ocean -- we would have very serious gaps.

The whole international weather surveillance structure would be compromised not only for these remote atmospheric soundings from space, but also, the location and collection of data from drifting ocean buoys, balloons and automatic observing systems in inaccessible places or even on ships which are moving since the system allows the location of the ship and as well as transmission of the data it collects.

All this is bad enough for day-to-day weather forecasting. Its impact on the global climate data sets being collected is even worse. A gap in a climate record, as Mr. Leavitt has said, destroys it for a significant period on each side of the gap. How can one get an average when important data which contribute to that average are missing?

~~I think~~ I must say that the satellite program is sick in other respects from these cutbacks. The innovative arrangement between NASA and NOAA which worked so well until a few years ago to provide new instrument development, prototypes of NOAA operational satellites and procurement services for NOAA, has been almost totally abrogated. Weather satellite development is not only on the back burner, Mr. Chairman, but the back burner is almost out.

What is so difficult to understand, as others have alluded to here, is that atmospheric science research programs in NSF and NASA and other agencies have all gone up while the NOAA budget, which provides much of the precious ~~operational~~ research data -- ~~which~~ is collected operationally ~~it is used for research~~ -- important research these programs' needs data will be cut.

~~So~~ If you now have the impression that the present situation leaves much to be desired, the future is even more bleak. The long-term is bleak because there are not only no new approved developmental spacecraft, but there are not even any approved plans addressed to the future. ~~That~~ That future --

we must not only be concerned with the atmosphere, but with the oceans as well. The oceans are the great heat storage flywheel of the climate system. They cannot be ignored as we try to improve our understanding of seasonal and inter-annual climate variations so important to society.

Advances in ocean observations are essential if we want to predict climate fluctuations and understand mankind's influence on climate. We already know that important ocean surface parameters can be measured from space. These include the surface topography of the ocean, which is the only way of examining the large-scale ocean circulation and its variations, and the wind stress at the sea surface, which provides the motive force for these currents.

What is missing is a unified, well-integrated program for the future which puts all these inter-related observations of the earth together. We must know the state of the atmosphere, the ocean, the ice fields, the biosphere at more or less the same time. Our foreign colleagues are moving forward in some of these areas.

However, in order to get the full impact of all of these developments, we not only need a clear program for the future of our own, but a program that meshes effectively with those of Japan, Europe and others who are making important contributions. There are opportunities for a few impressive shorter-range opportunities that are being passed

by in the NOAA budget.

An additional major contribution of the polar orbiters is their ability to carry an advanced microwave sounding unit that can obtain the atmosphere's temperature and moisture structure through most clouds. The present microwave sounders are crude compared to what the technological advances now make possible. These sounders can measure the intensity of cloud-shrouded hurricanes and help determine the atmospheric structure which controls their path. They will help provide better forecasts of severe weather because often severe weather is also buried in active cloud systems.

Polar orbiters cannot view severe stores continuously, as a geostationary satellite system can. But even so, they provide key information on the progress of storm development. What we really need, however, is a microwave sounding unit at geostationary altitude. The radiometer technology is already available and all we need is a large -- but not impossibly large -- antenna.

With the ability to see through clouds continuously to provide the structure of severe storms themselves, as well as that of the atmosphere in which they are embedded, we will be able to utilize mathematical models of severe weather systems as effectively as we now use forecast models of large-scale weather. In the meantime, NOAA ought to move forward with the operational use of the new infrared sounder, called VAS, which is the on the current series of geostationary satellites.

Really significant improvements in both weather services and research efforts are possible. These are not idle dreams; these advances are realizable before the end of the century if we choose to grasp the opportunities within our reach.

I could dream further about what is possible in the future, but I must again call your attention to the budget of the present. These needs for the future, Mr. Chairman, pale in comparison with the urgency of saving the present. A slip

backwards, which the present budget will surely force, will take us a long time to recover from. Mr. Chairman, I urge you and your committee to do what is necessary to prevent what I can only term a tragedy for the atmospheric sciences and climate research.

Now, I would like to add a couple of words, and these are my own. The earth is so precious that we cannot move backward on the need to better understand the health of the earth. We are the only planet with water, with life, with love, unfortunately also with conflict. We need to make this imperfect world work better.

Cutting back, particularly where so much could be done on this understanding, is like putting our head in the sand.

Thank you, Mr. Chairman.

Senator Trible: Thank you, doctor.

Senator Pressler.

Senator Pressler: Thank you very much for allowing me to go first here. I have another meeting to go to and I appreciate it very much.

Let me just for a moment ask a theoretical question about weather reporting. If we were to have this on a free market basis, if we were to, let us say, turn it all over to private industry, or some of it, we had satellites or whatever, would it not mean that agricultural areas would ultimately get less because it would be so expensive? I mean, you might have

good weather reporting for New York City, where you could sell the information to large radio stations where they have big advertisers, but some of the soil and water conservation needs, some of the soil moisture information, some of the weather reporting, is so critical to agriculture, not only on a daily basis but yearly basis to see what is going on in terms of long-term projections.

Would that be really a problem if we tried to put that on a private enterprise basis?

Mr. Suomi: Well, it is clear that if it were on a private enterprise basis it would have to make use of the play of the marketplace. Unfortunately, little of the large pile of information I have on the commercialization of satellites deals with the technical, the scientific details of the sensors, the orbits, the operating schedules and the like.

Little has been mentioned by the commercial entities pushing this move. It is impossible to assess the impact of commercial utilization without this information, and we may be buying something we do not really understand. So there is a great deal of concern about that.

Now, in some of the material that I have seen there is a request, ~~for example, and so~~ for which I have a serious concern, is the ~~request~~ that data on weather and the earth be subject to copyright, and copyright protection. In one statement they are

even pushing for exemption to the Freedom of Information Act. This flies squarely in the face of a long tradition of free international exchange of weather data.

So your concerns are well warranted and it seems to me that what this committee could do is to be sure that in a series of hearings that you might conduct, that we hear all aspects of the program that is being proposed.

Senator Pressler: The other part of that question is, as you know there has been some discussion this morning about commercializing specialized weather services, such as detailed wind pattern forecasting, soil moisture content information, and other weather services that are vital to our nation's farmers and small businessmen. And you have commented on that.

I would like to ask you also, as professionals in this business to what extent do you think these services should be commercialized? If not entirely, should parts of them be commercialized? And how could this be done while still guaranteeing availability of the service to all users?

Is there any in-between ground?

Mr. Johnson: Well, it is very difficult to establish neat boundaries. I think that probably one should never expect to establish neat boundaries. I think that, as Peter Leavitt mentioned, it is an evolutionary thing. You try. You may make adjustments from time to time as you see how

things develop.

I am not aware of any people in our profession, those that I know well anyway, who feel that the government should abrogate its responsibility to provide at least the basic weather services of this nation. The problem is to define what is the extent of that basic service. Does it go to general forecasts for major sectors, like aviation and agriculture?

You cannot consider the answer without getting into the technical details, as Professor Suomi said. You have to have experts take a look at how all of these services are performed and all of the steps in providing these services, and see whether there are any reasonable scientific and technical options that could perhaps allow some of these services to be as effectively or maybe even more effectively done in the private sector.

But I think it has to be done with very great care and study. It is nothing that you would want to do, sort of a snap decision off the top of your head.

I think that one also has to be careful about any major separation of the observations from the production of the forecasts. That is one of the areas that would concern me with the current proposal. Admittedly, we have no information on the details of the proposal to so-called commercialize the weather satellite system.

Senator Pressler: So are you saying we should not commercialize any part of the Weather Service?

Mr. Johnson: I did not say that, Senator. I said that it should be done with great care, considering the intricacies of the total system and how it goes from observations through forecasting to dissemination, what the interfaces are at each point and what is the interface with the ultimate customer, how could you effectively do that in light of new technology.

Mr. Suomi: I would like to add to that. Clearly, there is a role for the private sector. It has been already done fairly well in the distribution of general weather information through the communications branch of our economy.

But there are also other possibilities. There is a great need on the part of the private sector who works with details to have access to all the data they need. I think Mr. Leavitt made quite a point of that. And it is perfectly possible for such a group to be responsive, much more responsive to very specific needs, and they can therefore massage the data in a form which makes it very valuable to their potential customer.

Clearly there is a real role here, because a special service is being rendered. We note that data is being converted into information and information has value, and the private sector would certainly help create this information

and distribute it to the people who want it. So there is a role, I believe, for the private sector.

It would be advanced greatly if the data could be made more accessible for their use, rather than to have some restriction on it, which the general commercialization might in fact do.

Senator Pressler: Mr. Chairman, I would again ask that committee staff try to find out if we can make this study available, because I would like for these two witnesses to give later on a written response. It is the study that was prepared and signed by Earl Peck, Major General, Director of Intelligence and Space Policy, Department of Defense, and by Kathleen Charles, Deputy Comptroller of Goddard Space Flight Center, National Aeronautics and Space Administration.

If it is appropriate, I would like it to be made available to the witnesses to give a written response later. this says many of the same things that the witnesses are saying. It is an inter-agency government report dated 10 November 1982, that seems to contradict everything that is coming out at the top.

But maybe there are things in here that need -- this is a good study. I would first ask unanimous consent that you have staff -- if our staff could check this out and make it available for witnesses to come here and look at it. I do not know what "Official Use Only" means.

Senator Trible: Without objection, it is so ordered, and that assignment will be undertaken by staff.

Senator Pressler: Great.

My last question is: In view of this study and others, how long do you think it would take to complete the proper studies and analyses -- of course it is an ongoing thing, but before we venture into selling part of our weather services, what kind of studies would be appropriate to precede such an act?

Mr. Suomi: Well, I would think that a very thorough study would have to be made, and as I indicated early in my testimony, I am quite confident that the Academy group, the Board which I am a member, would be willing to look into this matter.

They clearly indicated a great interest, but at this stage have very little information and so have no position. They want, if possible, to have much more information before they come up with a position. So I would think you would have to deal with their staff to see what the time response would likely be.

Senator Pressler: Thank you, Mr. Chairman. I have no further questions, unless the witnesses are able to respond in writing later to this study.

Senator Trible: Thank you, Senator Pressler.

Gentlemen, we thank you for your testimony today. You

are distinguished witnesses, and your statements and observations will add immeasurably to our understanding of these issues.

Senator Hollings has a statement for the record that will be made a part of the record.

[The material referred to follows:]

[COMMITTEE INSERT]

Senator Trible: Also, I have some additional questions that I would like to submit to you for the record.

[The material referred to follows:]

[COMMITTEE INSERT]

Senator Trible: With that, we will adjourn our meeting today. Thank you very much.

[Whereupon, at 11:35 a.m., the committee was adjourned.]

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